

Incorporating Values into Community-Scale Sustainable Forest Management Plans: An Application of Q Methodology

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Abstract Incorporating people's values into forest management plans is an important component of sustainable forestry practice. Q methodology was used to identify perspectives on sustainable management of a community-owned forest reserve in a village in Puebla, Mexico. The study demonstrates the value of Q methodology in characterizing the views of citizens toward the forest and accommodating these views in a sustainable forest management plan. The plan we developed based on our research enjoyed widespread community support and far outdistanced its support of two alternative plans developed by outsiders. Our plan reflected the village's strong preference for non-consumptive uses with regulated timber harvesting to sustain the ecological health of the forest and to provide short-term economic benefits.

Keywords Sustainable forest management · Q methodology · Forest values · Community forestry · Public participation

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Introduction

In recent decades, the role of community-based forest as a mechanism to achieve sustainable forest management (SFM) has gained much more attention. SFM is a holistic concept in which forest sustainability, community wellbeing, and participation are inseparable elements. Menzies (2007) estimates that around 10% of the world's forestland is under some form of community-based ownership. Community forests pose significant challenges to centralized State intervention; therefore, community-based forest management (CBFM) strategies deserve particular attention if both sustainable forests and sustainable communities are to be realized.

Several researchers have argued that SFM is enhanced through stakeholder involvement (Carr and Halvorsen 2001; Dourojeanni and Seve 2006; Parkins and Mitchell 2005; Pujadas and Castillo 2007; Steelman and Maguire 1999; Stoll-Kleemann and O'Riordan 2002). Stakeholder participation as an element of SFM is particularly relevant in small communities that depend on communal sharing of goods and services, local responsibility for forest health, and a balance between local and national interests (Harrison and Suh 2004). Despite the lack of a universally accepted framework on how to approach ideal SFM, global concern for developing strategies that incorporate community values in forest planning is growing (Adam and Kneeshaw 2008; Berninger et al. 2009; McFarlane and Boxall 2000; Sherry et al. 2005; Steelman and Maguire 1999; Swedeen 2006; Xu and Bengston 1997). Therefore, the quest for practical participatory approaches at the community level deserves more attention.

Reaching agreement among stakeholders in forest management can be challenging due to differences in values and objectives (FAO 2007; McFarlane and Boxall 2000; Richards et al. 2003). Stakeholders often pursue different interests concerning subsistence, forest health, labor and employment, social justice, gender equity, markets for forest products, water supply, and spirituality, among others (Pierce-Colfer C 2005). To overcome these challenges, SFM may be accomplished best at the local community level (Adam and Kneeshaw 2008; Klooster 2002; Mrosek et al. 2006; Sheppard 2005; Sherry et al. 2005). Local communities have firsthand experience with forest benefits and share geographic location, resources, and cultural values that facilitate communication (Menzies 2007). Small communities more often also share concerns about equitable distribution of costs and benefits, empowered participation in decision making, respect for local culture, and stewardship of ecological services. In addition, small forestry communities provide meaningful criteria and indicators of SFM (Sheppard and Meitner 2005; Sherry et al. 2005; Woodley et al. 1999; Wright et al. 2002) because peoples' needs, values, and priorities can be integrated into them.

The participatory development of local forest management plans can also better meet community needs through effective assessment of local knowledge about ecological, social, and economic contexts (Berkes and Folke 1998; Carr and Halvorsen 2001). Local participation also helps create social equity and enhances environmental sustainability (Benjade and Ojha 2005; Hunt and Haider 2001; Knopp and Caldbeck 1990). Lane and McDonald (2005) argue that local participation allows citizens to better "understand and intervene in environmental

problems because they are ‘closer’ to both the problem and the solution” (p. 710). CBFM as a means to achieve SFM through vigorous participation appears promising. It provides a place to express values and agree on actions, thereby enhancing political legitimacy. Due to the closeness of the forest resource, CBFM more easily identifies ecological problems.¹

Nevertheless, even at small scales, barriers to participation can contribute to failures in achieving expected outcomes. Diverse perspectives and preferences for different benefits can place values in conflict (Arvai et al. 2001). Gender inequity (Menzies 2007; Mitchell 2006; Pierce-Colfer C 2005; Stoll-Kleemann and O’Riordan 2002), issues of land tenure (Carruthers 2001), and the weak practice of democracy in some countries can hinder participation (Alteiri and Rojas 1999; Midlarsky 1998). Furthermore, conflicts between expert knowledge and local practices (Blanchet 2001; Cojti-Cuxil 1998; Lane and McDonald 2005; Stoll-Kleemann and O’Riordan 2002) can transform citizens from active participants to passive information recipients (Rowe and Frewer 2004). These challenges suggest that simple participation alone is not sufficient to promote SFM. Understanding local interests, values, and needs is essential to overcoming barriers to communication among stakeholders and between citizens and experts, which increases trust and forges a foundation for consensus.

Winter (2005) observed that “multiple stakeholders compete for their different views to be heard.” Barry and Proops (1999) reported that it is hard to judge whether environmental policies are socially acceptable and implementable if public discourse is hindered. In this sense, it is important to understand perceptions of forest owners towards the use of the forest and identify areas of difference in relation to forest management. Understanding key aspects of people’s viewpoints make SFM decision processes more responsive and transparent.

Case Description

In November 2007, the College of Agricultural Sciences and Natural Resources at Oklahoma State University partnered with the *Universidad Popular Autonoma de Puebla* (UPAEP) in an effort to assist a rural forestry village in a sustainable forestry project in Mexico. *La Preciosita Sangre de Cristo*² is a village located along the Sierra Nevada mountain system in the State of Puebla. The village takes its name after a sanctuary constructed in 1792, which is located at the village’s edge. The village population is 890, according to 2006 Mexican census; 287 of whom (primarily young and middle aged men) have migrated to the United States for employment, leaving a resident population dominated by children, women, and the elderly. *La Preciosita* is an *ejido*, a form of land tenure in which the land is shared by its citizen. On average, each farmer has 2–3 hectares of land to cultivate. The

¹ Moreover, CBFM can serve as a model for other communities that experience problems with organization (Fraser et al. 2006; Sherry et al. 2005).

² This background was extracted from an unpublished document, *Ordenacion Territorial del Municipio de Tlahuapan*, which is part of a project established by the ONG Enlace and the government of Puebla.

village's economy is based on subsistence farming; corn, beans, and wheat are the principal crops, with seasonal production of vegetables. Some families have cattle that produce milk to be sold within the village. Most families grow chickens on their patios for personal use. To augment agricultural income, women weave tablecloths and napkins that are sold in a famous large market located an hour's drive from the village. Some men also travel to large cities to work in construction (in addition to those who migrate to United States and Canada).

La Preciosita has an elementary school and long distance middle school in which students are in a classroom under the supervision of one teacher but the classes are transmitted on TV. The closest high school is 3 km away and belongs to the neighbor community. Public services are quite deficient; electricity is intermittent, water is channelized from a small creek, and waste management does not exist; only the sewage service is in good condition. The community is classified as the least developed area of the region.

The role of men in the community is centered around farming, conservation of the forest reserve, and political administration. The role of women revolves around school, health, nutrition, and promotion of development projects. Although the voices of women are silenced by the tradition of men making community decisions, their active participation in development projects has grown in recent years.

Despite the unsatisfactory economic situation, the community is known for its cultural richness, which relies on the spiritual importance of its forest resources and its preservation of traditions inherited from the Aztec Empire. In 1972, 100 community citizens (99 men and 1 woman) purchased nearby forestland totaling 416 hectares. In the early 1980s, this forestland was legally registered as a Unit of Management and Harvesting of Wildlife (UMA for its Spanish acronym) under the name *Reserva Ecológica Campesina La Preciosita Sangre de Cristo*. The term forest reserve was adopted by the stakeholders; in this document, reserve and forest are used interchangeably. An approved legal title established a deer-hunting project inside the reserve, which failed 5 years after its implementation. Since then the reserve has not been subject to coordinated management of any kind, although the extraction of timber and non-timber products has been practiced.

Land tenure of the reserve has been modified since the date of its acquisition. Originally, the names of the 100 community members investing in the forestland appeared in the legal title as principal owners. Later, due to young male's migration to USA, there was not enough manpower to work the land; therefore, additional names were legally added to the title to allow owners' male children to participate as secondary owners.

The reserve is home to more than 40 species of fauna (mammals, birds, and reptiles), 5 species of pines, 7 species of broad-leaf trees, and more than 20 species of herbaceous plants. In 2006, a small group of forest owners paid to develop a plan for timber harvesting, which was approved by the State's forestry authority. Mexican's forestry legislation required professional management plans to harvest timber in private lands. This plan was merely a harvesting schedule designed to harvest 230 hectares to extract 28,060 m³ of timber over a period of 6 years with a rotation of 50 years. However, there was a general discontent with this plan because it was developed without all forest owners' consultation.

Forest owners agreed that they wanted to use the forest to improve their quality of life; disagreements arose on how best to accomplish this goal. Therefore, the community sought help in the development of a new management plan. Preliminary consultation with the owners indicated that the new plan needed to not only comply with Mexican Forest Law but also accommodate community values and incorporate SFM principles and practices.

The question faced was how best to identify and incorporate the diversity of community's views into a SFM plan. Q methodology was employed to identify forest owners' perspectives on sustainable forest management. These perspectives were then used to assess value conflicts and formulate a consensus sustainable forest management strategy to be presented to the community for its consideration in an analysis and deliberation process.

Q Methodology

Q methodology, originally developed by William Stephenson in 1935 (Brown 1980; McKeown and Thomas 1988; Stephenson 1953), is a technique that has been used successfully to reveal subjective views, which are composed of beliefs, motivations, perspectives and attitudes that people develop, allowing stakeholders to "define their opinions on an issue" (Ockwell 2006, 167). It has been used to identify people's views for use in community decision-making (Barry and Proops 1999; Focht and Lawler 2000; Focht 2002; Ockwell 2008; Pelletier et al. 1999). More specifically, Q methodology has been used to capture people's perspectives on forest planning, to identify preferences for forest management, discover internal and external constituencies, and characterize areas of agreement and disagreement (Dasgupta and Vira 2005; Hooker 2001; Steelman and Maguire 1999; Swedeen 2006). It has also been used to investigate public perspectives on forest mitigation of climate change (Nijnik 2005), perspectives on forest use in the context of sustainable development (Clarke 2002), and perspectives on small scale forestry development in countries in transition (Nijnik et al. 2009). However, it has not been used to incorporate stakeholder perspectives into community forest management plans.

Q methodology encompasses both a well-founded theoretical framework and a systematic procedure in the study of human behavior. The technical procedure includes obtaining a concourse of communication, selection of a Q sample from the concourse, purposive identification of a P sample of persons to interview for Q sorting, the Q sorting procedure itself, and statistical analysis of the sorts. The analysis yields factors that reveal shared views or perspectives about a topic. Thus, people with similar views will significantly load on the same factor. Brown (1980, 1993) and McKeown and Thomas (1988) present an extensive explanation of the methodology and its applicability.

Population, Participant Sample, and Instrumentation

In this study, the population was limited to the 100 principal owners or their successors. In April 2008, fifty in-depth interviews were held in Spanish and tape-

recorded. (Table 1 lists relevant demographic characteristics.) The purpose of the interviews was to explore the relationship between forest owners and the forest.

Content analysis of the interviews was used to characterize people's responses to our questions. Several topics were frequently stated, such as employment, fresh air, reforestation, collection of hay, fuel-wood, wildlife enjoyment, community management, professional management, family recreation, tourism, timber production, administration, ownership, visiting the altars, staying in forest huts, the forest is green, the forest is peaceful, and the forest is a place of life. Altogether, 322 statements comprised the concourse, which contains the universe of opinions about the relationship of forest owners to the forest. These statements were assigned to one of three groups: economic, ecological, and social.

The 36-item Q sample for this study was drawn from the concourse. The statements were selected to represent the breadth of opinions and values on forest resources distributed across the economic, ecological, and social domains of forest management.

To elicit forest owners' perspectives, in June 2008, 20 forest owners sorted the statements in a pre-formatted, nine-column quasinormal distribution array from "like me" on the right (statements consistent with the sorter's own view) through "indifferent/ambivalent" in the middle (statements that held little salience for the sorter or about which the sorter felt both positively and negatively) to "unlike me" on the left (statements that were not consistent with the sorter's view). The condition of instruction that guided the sorting exercise was: "*How do you relate to the forest?*" The placements of statements in the Q sort were scored +4 (very much "like my view") to -4 (very much "unlike my view") depending on the column in which the statements were placed.

Table 1 Demographics for interviews and Q sorts

Demographics	Interviews	Q sorts
Gender		
Male	29	11
Female	21	9
Age		
18–25	5	2
26–35	12	4
36–45	13	6
46–55	13	7
56–65	4	0
>65	3	1
Education		
Elementary (completed 3 years)	23	3
Elementary (completed 6 years)	16	11
Secondary	8	5
Post-secondary (VoTech and college)	3	1

Factor Analysis

The scores of the 20 Q sorts were entered into the PQMethod 2.11 (2002) factor analysis program. Eight principal component factors were initially extracted; Varimax rotation was used resulting in three factors that explained 65% of the variance. Using a significance level of $\alpha = 0.001$, factor loadings in excess of 0.55 ($=3.29/\sqrt{N}$ where N = number of statements) are defined as significant. Of the 20 sorts, 15 were significantly loaded on one and only one factor (known as pure sorts), 3 were significantly loaded on two factors (known as confounded sorts), and 2 sorts did not load significant in any factor (see Table 2).

The interpretation of the prototypical sort associated with each factor is based on the factor score array. The factor scores are calculated as the weighted average of the Q sorts associated with the factor. These values are then arrayed in the same pattern as in the 9-column Q sort (see Table 3.) The interpretation of the statements corresponding to each factor score array thus articulates the meaning of the commonly held perspective captured by those persons whose sorts significantly loaded on that factor.

Table 2 Q factor loadings

Sort number	Factor loadings ^a		
	A	B	C
2	0.845	0.117	0.198
9	0.796	0.149	0.369
7	0.744	0.218	0.082
4	0.730	0.041	0.028
11	0.669	0.428	0.156
10	0.666	0.201	0.282
5	0.658	0.361	0.278
16	0.619	0.488	0.246
18	0.617	0.564	0.175
17	0.589	0.557	0.118
3	0.552	0.587	0.224
8	0.541	0.306	0.615
15	0.479	0.224	-0.246
14	0.479	0.696	-0.131
1	0.467	0.669	0.192
13	0.465	0.467	0.486
19	0.385	0.719	-0.026
6	0.155	0.625	0.376
12	0.076	0.034	0.797
20	-0.281	0.796	0.067
% Explained variance	33	22	10
#Significant loaders	11	8	2

^a *Bold* indicates significant loaders

Factors' Interpretation

Factor A: Conservation

The perspective shared by the owners defining this factor is labeled *Conservation*. They relate their own health to the health of the forest and thus the condition of the forest is paramount. *Conservationists* associate a healthy forest as one with abundant trees and wild animals. They place emphasis on non-consumptive uses of the forest understanding that the forest provides many benefits such as jobs, family recreation, and enjoyment of wildlife watching. Clean air, shade, and a sense of peace are also important.

In addition, they have a strong spiritual connection to the forest. They perceive the reserve as a place in which all forms of life are present including theirs; this feeling provides a sense of tranquility. *Conservationists* do not perceive the reserve to be in good condition, hence they oppose extractive activities such harvesting logs and hay or grazing animals. However, as the placement of statement 19 suggests, the reserve is seen as a source of youth employment—but for non-consumptive purposes. Although, statement 22 (related to forest as a tourist attraction) does not occupy the highest degree on the scores (+1) it still has some importance; as opposed to extraction of logs that is the less desire for these sorters (-4).

Conservationists strongly believe that a new and better way of administration is needed. They share a desire to implement community management and engage in reforestation projects to enhance the flow of goods and services obtained from the reserve.

Four of the significant sorts are children of principal forest's owners. This shows the commitment of the community's youth to improving the condition of the forest given their view of the forest as a source of employment for both current and future generations.

Factor B: Community Development

Factor B is labeled *Community Development*; eight forest owners share this perspective. It reveals a strong desire to preserve the forest as a tourist attraction to obtain income for the community. People who share this perspective have a higher desire than *conservationist* for the reserve to provide jobs for the young population. The high rank (+3) of the statement related to the ownership of the reserve, indicates that the reserve is seen as a private asset that needs to be managed with the help of experts. For this reason, the *Community Development* group feels a personal commitment to participate in all activities associated with the reserve. Owners sharing this perspective place more emphasis on administrative issues.

This group does not share with *Conservationists* a deep concern for the ecological condition of the forest, though they acknowledge the fact that it provides oxygen and keeps them healthier compared to those who live in the city. In addition, they do not perceive the forest as a place of personal and/or family enjoyment. They do not want to practice husbandry activities within the reserve such as the collection of herbs and fuel-wood or animal grazing; however, they want to spend time there.

Table 3 Statements and factor score arrays

Number	Statement	Factors		
		A	B	C
14	The reserve keeps us healthier than those who live in the city	4	2	0
4	The reserve should have more trees	4	1	4
31	The reserve needs better administration	3	4	-2
12	The reserve provides oxygen to our bodies	3	2	0
3	The reserve should have more wild animals	3	1	3
1	The reserve means a place of life	3	1	0
19	I would like the reserve to provide jobs for young people	2	3	-1
23	I feel more peaceful when I am in the reserve	2	1	0
13	I like to go to the forest because it has shade, it is green, it is beautiful	2	0	4
20	I enjoy watching wild animals in the forest (deer, llamas, birds)	2	0	2
21	I want to participate in reforestation projects	1	3	3
15	The community has the ability to manage our reserve	1	0	2
32	The reserve offers several benefits to me	1	0	1
2	I like to go to the reserve for a pleasant field trip	1	-2	1
16	I like to bring my family, who live in the city, to the reserve	1	-2	-3
22	The reserve should be kept as a tourist attraction as a source of income for the community	1	4	-1
18	I like to go and take care of the reserve	0	2	1
27	The reserve should remain close, every time someone goes, they should ask permission	0	2	-2
35	The reserve is important for the economic well being of my family	0	1	2
8	I want to spend more time in the reserve huts	0	0	3
30	The reserve is in good condition to be used as an economic asset	0	-1	2
11	I feel ownership of the reserve	-1	3	1
36	People from outside should help us to manage our reserve	-1	3	-1
34	I use fresh herbs from the forest in my regular cooking	-1	-1	0
10	Others should not have access to the reserve	-1	-1	-2
26	I do not need to go to the reserve to collect fuel-wood	-1	-2	3
5	I like to go to the reserve to bring flowers to the saints	-2	-1	1
28	I have never been in the reserve	-2	-1	0
25	Going to the reserve makes me tired because of the work I have to do	-2	-2	-3
29	Wild animals scare me	-2	-3	-3
9	I would rather stay at home with my family than going to the reserve	-3	-3	-4

Table 3 continued

Number	Statement	Factors		
		A	B	C
24	I prefer to be in the city	-3	-3	-4
33	The reserve is a place to bring our animals to pasture	-3	-4	-2
7	I want to obtain more hay from the reserve	-3	-4	-3
17	We need to extract logs from the reserve to support our projects	-4	2	0
6	I want to obtain more fuel-wood from the reserve	-4	-3	-1

The positive score of 2 assigned to the statement related to extraction of logs indicates that people in this group perceive timber harvesting as a source of employment and income. These owners envision the reserve as a workplace that needs to have controlled access.

Four of the eight significant loadings on this factor are direct owners—middle-aged males who participated in the deer-hunting project. The experience on that project led them to understand that the main problem was administration rather than decreases in market demand or/and supply. Conversations with them revealed that the project was economically successful: a steady number of visitors from other cities and States not only hunted deer but also used other services such camping, guided tours, and traditional cooking. The health of the herd was good and the rate of reproduction was well balanced. Furthermore, a new skill as deer farmers was learned. The participants believe that keeping the reserve as tourist attraction would be a way of recovering the old project, which provided satisfaction. The use of outside experts in administration would repair past mistakes. As members of this group spend more time in the reserve, they also see the potential of the reserve to be harvested.

Factor C: Family Recreation

Two sorters defined the third viewpoint; this group shows strong emphasis on the reserve as a place for passive recreation. They, as owners go there to spend time in the huts and be able to enjoy wildlife and landscape. This group associates the number of trees with the satisfaction of looking at green places. In this sense, reforestation is recognized as an activity they want to undertake to enhance the beauty of the reserve. Although they enjoy visiting the reserve, extractive activities for personal use such collection of hay or fuel-wood are not supported.

Moreover, this perspective indicates that the reserve is important for the economic well being of their families. In this sense, they recognize the reserve is in good condition to be used as an economic asset. However, they do not envision the reserve neither as a place for tourism nor to extract logs. They also do not want the reserve to provide jobs for the young population.

These owners perceive the reserve as sacred place to which they go to worship the saints and enjoy nature; therefore, they believe that free access should be

granted. Their strong opinion about not wanting to live in a city unveils their firm attachment to their community and forest; consequently, these forest owners are confident that the community can manage the reserve.

Unlike *Conservationists*, this group does not associate their own health to the health of the forest despite the fact that they like to go there to enjoy wildlife. They rather place more emphasis in the reserve as an important part of their economic well-being.

Discussion

Three perspectives on the use of forestland were identified; they all acknowledge the importance of preserving the reserve as a source of goods and services. A holistic view of the forest to support their lives is revealed.

All three perspectives recognize the economic, ecological, and spiritual benefits of the forest; they want to use the forest as a source of income and employment but they differ on the kind of forest management they want. In this sense, the use of the reserve as tourist attraction is strongly supported by *Community Development* owners, *Conservation* group considers it as a possibility, while *Family Recreation* owners oppose to it.

On the other hand, *Community Development* owners would not oppose limited timber harvesting if professionally managed; after all, the community has benefited from income obtained from timber selling in the past. While *Conservation* owners strongly oppose to it and *Family Recreation* group does not show any strong feeling associated to logging.

Conservation and *Family Recreation* sorters share a desire for community management. Meanwhile *Community Development* sorters prefer professional management due to their unfortunate experience on the past.

The views of *Conservation* and *Family Recreation* owners recognize that the reserve needs more trees; the quantity of tress is associated to their personal enjoyment and health. The first compartment of the existing plan was recently harvested; therefore, forest canopy looks less dense, which forest owners associated with deforestation. The community is concerned about deforestation because the forest has been subject of vandalism (illegal timber harvesting) due to the lack of effective management.

Conservationist and *Community Development* share the view of the reserve as a source of jobs for young population. *Conservationist* and *Community Development* also share the view of better administration. The community's unsuccessful experience with the deer-hunting project is instructive. An entrepreneur from outside of the community invested in this project as a valuable economic asset. Every year different members of the community managed the project without having much experience and knowledge. The project lasted only 5 years and many of the forest owners damaged their reputation with other members of the community, blaming each other for its poor administration. As a result, there is reluctance to undertake future ambitious projects. They understand that the forest provides benefits that deserve responsible management in the community's interest.

In this sense, *Community Development* owners differ from the other two groups in their view of how to approach reserve management. They perceive the reserve as a private asset that needs to be safeguarded from deterioration and which can be enhanced with adequate outside management.

On the other hand, *Family Recreations* is a group that seems to expend more time in the reserve and acknowledge the benefits of it, including the economic benefit. However, this group does not show any opinion on timber harvesting and slightly oppose to tourism.

These perspectives provide insight for the development of a forest management plan that will accommodate all views. They also frame the deliberation (conflict assessment) meeting in which the final plan will be approved. As Hooker (2001) suggested, perspectives from Q methodology can be used to define policy agenda and to improve the policy making process. In this sense, Niemeyer and Dryzek (2007) stated that subjective positions are important part of good deliberative outcomes. Likewise, Brown (1980) briefly explained the value of Q methodology in policy making, considering that opinions are policy recommendations. Accordingly, the opinions expressed in these three perspectives *Conservation*, *Community Development*, and *Family Recreation*, represent a wide variety of views from the community of *La Preciosita* and provide information on what is important to include in a forest management plan.

An important component of sustainable forest management is a plan that can be implemented at the community level. However, plan's implementation rests on clear integration of community values and effective community participation during the development of the plan.

Development of a SFM Plan that Accommodates Community Values

Our challenge was to develop a forest management plan that accommodated community values and obtain consensus among all owners. Perspectives obtaining from Q methodology provided insights that help to understand community's values and reasons associated to their preferences.

The analysis of factors' scores not only unveils relevant opinions (perspectives) but it also captures information of shared values. Thus, we could identify what is common among the participants even though they hold different perspective.

Those whose perspectives are revealed by *Conservationist* and *Community Development* share a preference for the use of the reserve as economic asset and provider of jobs for young people, but differ on who should be responsible for forest management and what kind of activity to pursue. *Family Recreation* reveals a perspective that the forest is a place of enjoyment that can be used to increase their economic well-being simultaneously. In general forest owners envision a plan that will provide economic benefits without jeopardizing the forest's health.

Although *Community Development* and *Conservationist* support a plan for tourism, *Family Recreation* seems not to be concerned about it. Conversely, *Conservationist* and *Family Recreation* oppose to logging. In addition, *Family Recreation* and *Conservationist* see the reserve as a place for personal spiritual

enjoyment and recreation; while *Community Development* envisions the forest as an enterprise. All three perspectives strongly oppose to harvesting hay, collecting fuel-wood, and practicing animal husbandry. Likewise, all three perspectives are concerned for the forest's health.

This information guided our formulation of a SFM plan that emphasizes tourism, recreation, and spiritual values, bans grazing, and allows selected timber harvesting, both as a short-term economic asset and to improve the health and aesthetics of the forest. The community controls forest access and participates in forest maintenance. Professional coordination during tree harvesting will assure preservation of the forest's ecological integrity and biodiversity, and enhanced forest structure³ minimizing the risks of fire and insect infestation. The plan will be implemented by members of the village with professional assistance.

Assessment of Alternative Plans

In two meetings with 57 forest owners, three forest management strategies were presented and discussed: the plan developed by the research team based on the Q methodological results, the previously developed timber harvesting plan, and a plan that continues management as currently practiced. These three strategies were explained in detail showing the advantages, disadvantages, and implications of pursuing them. After robust deliberation, which was also guided by Q findings,⁴ the owners unanimously approved the researcher-developed plan that emphasized tourism, with one subtle modification: the harvest of non-timber products could be conducted only by small businesses. Professional help will be sought to issue timber-harvest licenses and identify trees to be cut.

Findings and Conclusion

The village of *La Preciosita* selected the forest management strategy that emphasized tourism, which was developed from the Q perspectives. This plan includes selected timber harvesting to enhance the health of the forest and prepared it for future tourism activities. It also restricts the collection of hay, fuel-wood and other not timber products. Finally, the community will manage the reserve obtaining professional help thus previous mistakes can be avoided. The health of the forest is valued because it contributes to community pride, provides spiritual fulfillment, fosters personal health and family cohesion, and serves as an important reservoir of water. Though the economic benefit obtained from the forest is important, forest practices that jeopardize the health of the forest were not supported.

The selected strategy gained the support of the community because forest owners were able to articulate their values via the Q sorts. In addition, their direct

³ The current condition of some areas of the forest is poor. Unhealthy old grow forest is predominant as well as a large population of seedling with low probability of development without thinning.

⁴ A detail discussion on the analysis and deliberation meetings is not part of the objective of this paper.

involvement in the process of developing the plan was of significant importance for their support.

This study confirms that even within a small and relatively cohesive group of stakeholders, differences exist. Q methodology served as an important tool to analyze preferences and formulate a management strategy that accommodates all forest owners' perspectives to gain substantial community support for its adoption and implementation. As a community, forest owners of *La Preciosita* have their own holistic view of SFM which include their personal and community values.

The study also supports claims for including community participation in the process of SFM planning. Community participation occurred in two ways: the development of a forest management strategy in which they communicated their values, and during the presentation and deliberation meetings. The presentation meeting informed them about the advantages and disadvantages of pursuing each of the three alternative strategies. In the deliberation meeting, forest owners discussed the plans, exchanged their viewpoints, and decided the future of their forest. Q methodology thus served as an instrument to ease the tension and resolve the conflict that can attend high-stakes political participation. Including citizens' views in the management planning process led the community to increase its sense of ownership of the resources and its commitment to successful plan implementation, performance monitoring, and enforcement.

The process of community participation as means to achieve SFM needs more attention on how to integrate people's values into planning to gain not only increased legitimacy but commitment on implementation. Dasgupta and Vira (2005) argued that Q methodology helps identify "unanticipated or underlying social discourse" in which values are shared; thus, it can be used to explain, communicate, and implement forest values, and people's preferences associated with SFM. We believe we demonstrated the power of Q to forge consensus in this study.

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